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## (54) COLOR PRINTER, COLOR PRINTING SYSTEM, COLOR PRINT CONTROLLING METHOD AND COLOR PRINT DATA PROCESSING METHOD

(57) Abstract

PROBLEM TO BE SOLVED: To obtain a color LBP capable of color multilevel printing in which a variety of office uses can be dealt with by making possible to perform high resolution color binary printing at a higher speed with a specified quality, and resolution is prevented from lowering in toner saving print by utilizing the function at a multilevel print section.

SOLUTION: A color LBP capable of color multilevel printing is provided with a smoothing circuit for color binary printing, a video clock circuit, and a laser drive circuit so that printing can be performed in a plurality of print modes. At a host, image data in print data from an application is converted into bit map data corresponding to a print mode and transferred to a printer along with print mode information. In the printer, code data is developed into bit map data depending on the print mode information. Developed data is processed in one of a plurality of processing routes in order to perform ON/OFF control of laser beam. The number of dots per inch is set higher at the time of color binary printing than at the time of color multilevel printing.

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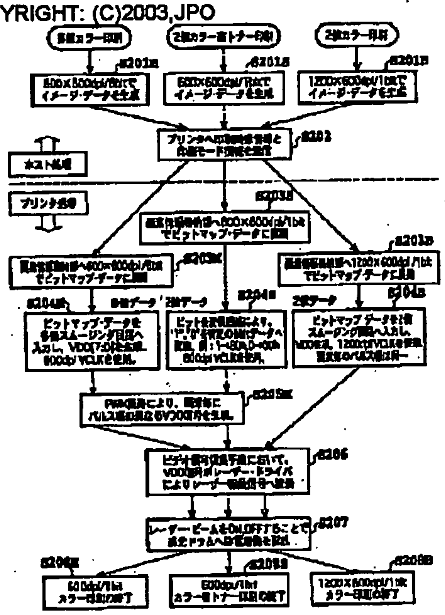

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## CLAIMS

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[Claim(s)]
[Claim 1] Print data and the print mode information which expresses one print mode in two or more print modes, and specifies the print mode of said print data are received from a host computer. A printing image generation means to generate printing image data for said print data according to said print mode information, A printing image storing means to store the printing image data which said printing image generation section generated, Input the printing image data from said printing image storing section, and output the signal for a laser drive which carries out the ON/OFF drive of the laser diode for exposing image support by exposure light. The printing image data from said printing image storing section is inputted as the 1st picture signal output means equipped with the Pulse-Density-Modulation circuit. The 2nd picture signal output means which outputs the signal for a laser drive which carries out the ON/OFF drive of said laser diode, and by which Pulse Density Modulation is not carried out, The color airline printer characterized by having the selection driving means which inputs the signal for a laser drive of said 1st and 2nd picture signal output means, is based on said print mode information, carries out the selection output of one [ a gap or ] signal, and drives said laser diode by the signal which carried out the selection output.
[Claim 2] As for said print mode, the amount of information per pixel of one color contains the binary print mode a multiple-value print mode 2 bits or more and whose amount of information per pixel of one color are 1 bit. Said printing image generation section Said print mode information at the time of a multiple-value print mode The code data contained in said print data are changed into multiple-value data 2 bits or more. Said print mode information at the time of a binary print mode The code data contained in said print data are changed into 1-bit binary data. Said selection driving means The color airline printer according to claim 1 characterized by choosing the output signal of said 1st image output means when said print mode information is a multiple-value print mode, and choosing said 2nd image output means output signal when said print mode information is binary print mode information.
[Claim 3] The binary printing image data the binary amount of information per pixel of one color from said printing image storing section is 1 bit is inputted. It has further a conversion means to change and output to the printing image data of a multiple value according to the translation table defined beforehand. Said binary aforementioned print mode When said print mode information is furthermore a ** toner print mode including a ** toner print mode, Said 1st image output means inputs and processes the printing image data outputted from said conversion means. Said selection driving means The color airline printer according to claim 2 characterized by choosing the output signal of said 1st image output means when said print mode information is a ** toner print mode.
[Claim 4] The clock frequency of a frequency higher than the clock frequency of the pixel unit which carries out the ON/OFF drive of said laser diode in said 1st image output means is used for said 2nd image output means. The signal for a laser drive which carries out the ON/OFF drive of said laser diode is generated. Said printing image generation section The color airline printer according to claim 2 characterized by generating the printing image data corresponding to the clock frequency of said 1st image output means or said 2nd image output means based on said print mode information.
[Claim 5] Said 1st and 2nd image output means are color airline printers according to claim 1 to 4 characterized by having the smoothing means of dedication, respectively.

[Claim 6] Said print data are color airline printers according to claim 1 or 2 characterized by performing printing processing at a high speed compared with the case where said print mode information shows a multiple-value print mode when it consists of data of two or more colors and said print mode information shows a binary print mode.
[Claim 7] The 1st image output section equipped with the Pulse-Density-Modulation circuit which outputs the signal for a laser drive which carries out the ON/OFF drive of the laser diode for exposing image support by exposure light per pixel using the 1st clock frequency, The 2nd image output section which outputs the signal for a laser drive which carries out the ON/OFF drive of said laser diode, and by which Pulse Density Modulation is not carried out using a different frequency from said 1st clock frequency, Input the signal for a laser drive from said 1st and 2nd image output section, and it is based on the inputted print mode information, and the selection output of one [ a gap or ] signal is carried out. It is a printing system including the color airline printer equipped with the selection mechanical component which drives said laser diode by the signal which carried out the selection output. According to said print mode specified by the user, about the image data contained in the data which were received from application, and which should be printed (**) -- resolution and (**) -- bit showing the 1-pixel data of one color -- bit showing the 1-pixel data of a number, resolution (Ha), and one color -- a number It has an amount-of-information conversion means to change into the mode which defined beforehand whether it was ********. The color printing system characterized by transmitting the image data changed by said amount-of-information conversion means as image data which transmits to said color airline printer, and transmitting the print mode information which expresses said print mode further to said color airline printer.
[Claim 8] Print data and the print mode information which expresses one print mode in two or more print modes, and specifies the print mode of said print data are received from a host computer. The printing image generation step which generates printing image data for said print data according to said print mode information, The step which stores said generated printing image data in the printing image storing section, The 1st output step which outputs the signal for a drive which carries out the ON/OFF drive of the laser diode for inputting the printing image data from said printing image storing section, and exposing image support by exposure light, and by which Pulse Density Modulation was carried out, The 2nd output step which outputs the signal for a laser drive which inputs the printing image data from said printing image storing section, and carries out the ON/OFF drive of said laser diode, and by which Pulse Density Modulation is not carried out, The color printing control approach characterized by having the output selection step which carries out the selection output of one signal of the signals for a laser drive outputted by said 1st and 2nd output step based on said print mode information.
[Claim 9] The amount of information per pixel of one color said print mode A multiple-value print mode 2 bits or more, The binary print mode whose amount of information per pixel of one color is 1 bit is included. Said printing image generation step Said print mode information at the time of a multiple-value print mode The code data contained in said print data are changed into multiple-value data 2 bits or more. Said print mode information at the time of a binary print mode It is the step which changes into 1-bit binary data the code data contained in said print data. Said output selection step The signal for a laser drive outputted by said 1st output step when said print mode information was a multiple-value print mode is outputted. The color printing control approach according to claim 8 characterized by being the step which outputs the signal for a laser drive outputted by said 2nd output step when said print mode information was binary print mode information.
[Claim 10] The binary printing image data the binary amount of information per pixel of one color from said printing image storing section is 1 bit is inputted. It has further the conversion step changed and outputted to the printing image data of a multiple value according to the translation table defined beforehand. Said binary aforementioned print mode When said print mode information is furthermore a ** toner print mode including a ** toner print mode, Said 1st output step inputs and processes the printing image data outputted by said conversion step. Said output selection step The color printing control approach according to claim 9 characterized by outputting the signal for a laser drive outputted by said 1st output step when said print mode information is a ** toner print mode.
[Claim 11] The clock frequency of a frequency higher than the clock frequency of the pixel unit which carries out the ON/OFF drive of said laser diode in said 1st image output section is used for said 2nd output step. The signal for a laser drive which carries out the ON/OFF drive of said laser

diode is generated. Said printing image generation step It is based on said print mode information. Said 1st output step, Or the thing for which the printing image data corresponding to the 2nd [ said ] output step which has the clock frequency of a frequency higher than the clock frequency of the pixel unit which carries out the ON/OFF drive of said laser diode in said 1st output step is generated The color printing control approach according to claim 9 by which it is characterized.

[Claim 12] Said 1st and 2nd output steps are the color printing control approaches according to claim 8 to 11 characterized by having the step which carries out smoothing of each output signal.

[Claim 13] Said print data are the color printing control approaches according to claim 8 or 9 characterized by performing printing processing at a high speed compared with the case where said print mode information shows a multiple-value print mode when it consists of data of two or more colors and said print mode information shows a binary print mode.

[Claim 14] The 1st image output section equipped with the Pulse-Density-Modulation circuit which outputs the signal for a laser drive which carries out the ON/OFF drive of the laser diode for exposing image support by exposure light per pixel using the 1st clock frequency, The 2nd image output section which outputs the signal for a laser drive which carries out the ON/OFF drive of said laser diode, and by which Pulse Density Modulation is not carried out using a different frequency from said 1st clock frequency, Input the signal for a laser drive from said 1st and 2nd image output section, and it is based on the inputted print mode information, and the selection output of one [ a gap or ] signal is carried out. It is the color print-data art equipped with the selection mechanical component which drives said laser diode by the signal which carried out the selection output for color airline printers. According to said print mode specified by the user, about the image data contained in the data which were received from application, and which should be printed (**) -- resolution and (**) -- bit showing the 1-pixel data of one color -- bit showing the 1-pixel data of a number, resolution (Ha), and one color -- a number It has the amount-of-information conversion step changed into the mode which defined beforehand whether it was ********. The color print-data art characterized by having the step which transmits the image data changed by said amount-of-information conversion means as image data which transmits to said color airline printer, and transmits the print mode information which expresses said print mode further to said color airline printer.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a color airline printer, a color printing system, the color printing control approach, and a color print-data art.
[0002]
[Description of the Prior Art] The color laser beam printer in which multiple-value fine printing is possible is opened explosively, it gets down from the request expansion to color contents printing of a digital photoprint, Web printing, etc. to a commercial scene utterly, and the replacement to a multiple-value color printer from the conventional binary monochrome printer is progressing not only in design business but in general office.
[0003] As a function of a color printer called for in office, it is monochrome contraction printing of the color copy as meeting handouts, such as 4up printing of for example, a PowerPoint (trademark) manuscript, and points, such as fine printing by which an attachment image image moreover is not crushed and binary color printing asked for printing speed and color reproduction nature rather than high definition image quality, or fine printing which does not cause low resolution-ization in ** toner printing, are mentioned. On the assumption that high-speed printing, though [ all ], good printing of printing grace is desired in it.
[0004]
[Problem(s) to be Solved by the Invention] However, as for the printing method adopted as the color laser beam printer announced from each current company, two kinds of printing methods of 600dpi / 4-8-bit multiple-value printing method, and a binary printing method (1200 or more dpi / 1 bit) will be held, and the function will have merits and demerits, if it sees from a user. This difference is concerned with the existence of a Pulse-Density-Modulation circuit (PWM circuit), the former has, and the latter is a printing method which it does not have. Although an attachment image seems to be able to realize highly minute image printing and not to be crushed in previous 4up printing, since there is much pixel amount of information to treat in the case of the former multiple-value printing method, since data processing takes time amount, printing speed will be sacrificed. On the other hand, in the latter binary printing, although printing speed is high since there is no **** in data processing about time amount, generating of the color which cannot be expressed, and a false profile, inferior [ of a monochrome image image ], etc. have a problem about image quality. Moreover, when ** toner mode was chosen by binary printing, the fall of print resolution had arisen for infanticide processing of a pixel.
[0005] the image processing system of the color indicated by JP,07-154599,A chooses the optimal method combining a different halftone generation method -- a print sheet -- not being concerned -- high resolving and Takashina -- the airline printer which is stabilized and can obtain a tone image -- indicating -- the airline printer -- quality of paper -- it has the means for switching which switches the output of each generation circuit which generates a halftone signal which inputs the same input data by the sensor and is different. This halftone generation circuit is a pulse-width-modulation circuit which used the triangular wave which made it generate every data and every two data, other halftone generation circuits perform error diffusion process and TIZA processing for 1 pixel using the clock divided into eight, and 1 pixel is the circuit which acquired the signal with which eight steps of pulse length differs as a result. Any input signal of a halftone generation circuit is multiple-

value data of the same kind. therefore, this technique -- input data -- leaving as it is -- quality of paper -- it can be called the technique of changing the mode finally printed on a form according to the input from a sensor. Here, about the processing time, reference is not made at all.
[0006] Moreover, in case it prints the binary image data inputted from the scanner, the image formation equipment indicated by JP,09-150552,A indicates the technique of changing printing concentration, changes binary image data into multiple-value image data according to the concentration value made into the purpose, and is using it as the airline printer which has the function to change concentration by the changed multiple-value image data. And two kinds are established as the expression approach of multiple-value image data, according to the partition in in the character mode / photograph mode chosen by the user, the digital copier of monochrome is made into an example and the technique which outputs the multiple-value data of one class is indicated. Therefore, this technique can also be regarded as the technique for realizing ** toner mode at the time of inputting binary image data.
[0007] Both these indicated equipments have the function which can carry out adjustable [ of the output of laser ] in analog in a Pulse-Density-Modulation circuit etc., and are only the classes of ON/OFF signal with which 1 pixel was multiple-value-ized as a class of laser driving signal. Although the technique indicated by these was a fundamental technique when solving the problem mentioned above, the airline printer which makes possible own alternatives, such as high-speed color printing which maintained the quality more than fixed, and ** toner printing, not according to printing which investigates only quality for the print data containing the color picture created with application but according to the occasional user situation was not offered.
[0008] The picture signal output section of plurality [ place / which this invention was made in view of such a problem, and is made into the purpose / control section / in an airline printer / image generation section ], The change-over section which chooses the image information from each image output section according to a print mode, and a print mode are followed. The data created with application 600dpi / 4-bit multiple-value highly minute print data, Or it has the function changed into binary high-speed print data, such as 1200*600dpi / 1 etc. bit, and is in offering the airline printer which can choose and print print-speed priority printing and printing quality priority printing with fixed quality according to user directions.
[0009] In case the data created with application are changed into 600dpi / 4-bit multiple-value highly minute print data, or 1200*600dpi / 1-bit binary high-speed print data, he is trying for image data to change code data (PDL data etc.) within an airline printer in the print driver in a host computer in this invention. moreover, individual in the picture signal output section which makes it synchronize with rotation of having a laser driving signal output circuit according to an individual according to a print mode by binary printing and multiple value printing in this invention, i.e., a rotating polygon, and makes laser emit light -- since the clock frequency of the picture signal output system in binary printing was made higher than the clock frequency at the time of multiple value printing by having more than one, the description is that it can print high resolution more compared with multiple value printing.
[0010]
[Means for Solving the Problem] In order to attain such a purpose, this invention invention according to claim 1 It is a color airline printer. A host computer to print data, A printing image generation means to generate printing image data for said print data according to said print mode information in response to the print mode information which expresses one print mode in two or more print modes, and specifies the print mode of said print data, A printing image storing means to store the printing image data which said printing image generation section generated, Input the printing image data from said printing image storing section, and output the signal for a laser drive which carries out the ON/OFF drive of the laser diode for exposing image support by exposure light. The printing image data from said printing image storing section is inputted as the 1st picture signal output means equipped with the Pulse-Density-Modulation circuit. The 2nd picture signal output means which outputs the signal for a laser drive which carries out the ON/OFF drive of said laser diode, and by which Pulse Density Modulation is not carried out, It is characterized by having the selection driving means which inputs the signal for a laser drive of said 1st and 2nd picture signal output means, is based on said print mode information, carries out the selection output of one [ a gap or ] signal, and

drives said laser diode by the signal which carried out the selection output.
[0011] Invention according to claim 2 is a color airline printer according to claim 1. Moreover, said print mode The amount of information per pixel of one color contains a multiple-value print mode 2 bits or more and the binary print mode whose amount of information per pixel of one color is 1 bit. Said printing image generation section Said print mode information at the time of a multiple-value print mode The code data contained in said print data are changed into multiple-value data 2 bits or more. Said print mode information at the time of a binary print mode The code data contained in said print data are changed into 1-bit binary data. Said selection driving means It is characterized by choosing the output signal of said 1st image output means, when said print mode information is a multiple-value print mode, and choosing said 2nd image output means output signal, when said print mode information is binary print mode information.
[0012] Moreover, invention according to claim 3 is a color airline printer according to claim 2. The binary printing image data the binary amount of information per pixel of one color from said printing image storing section is 1 bit is inputted. It has further a conversion means to change and output to the printing image data of a multiple value according to the translation table defined beforehand. Said binary aforementioned print mode When said print mode information is furthermore a ** toner print mode including a ** toner print mode, Said 1st image output means inputs and processes the printing image data outputted from said conversion means, and said selection driving means is characterized by choosing the output signal of said 1st image output means, when said print mode information is a ** toner print mode.
[0013] Invention according to claim 4 is a color airline printer according to claim 2. Moreover, said 2nd image output means The clock frequency of a frequency higher than the clock frequency of the pixel unit which carries out the ON/OFF drive of said laser diode in said 1st image output means is used. The signal for a laser drive which carries out the ON/OFF drive of said laser diode is generated. Said printing image generation section Based on said print mode information, it is characterized by generating the printing image data corresponding to the clock frequency of said 1st image output means or said 2nd image output means.
[0014] Moreover, invention according to claim 5 is a color airline printer according to claim 1 to 4, and said 1st and 2nd image output means are characterized by having the smoothing means of dedication, respectively.
[0015] Moreover, invention according to claim 6 is a color airline printer according to claim 1 or 2, and when said print data consist of data of two or more colors and said print mode information shows a binary print mode, it is characterized by performing printing processing at a high speed compared with the case where said print mode information shows a multiple-value print mode.
[0016] Invention according to claim 7 moreover, the signal for a laser drive which carries out the ON/OFF drive of the laser diode for exposing image support by exposure light The 1st image output section equipped with the Pulse-Density-Modulation circuit outputted per pixel using the 1st clock frequency, The 2nd image output section which outputs the signal for a laser drive which carries out the ON/OFF drive of said laser diode, and by which Pulse Density Modulation is not carried out using a different frequency from said 1st clock frequency, Input the signal for a laser drive from said 1st and 2nd image output section, and it is based on the inputted print mode information, and the selection output of one [ a gap or ] signal is carried out. It is a printing system including the color airline printer equipped with the selection mechanical component which drives said laser diode by the signal which carried out the selection output. According to said print mode specified by the user, about the image data contained in the data which were received from application, and which should be printed (**) -- resolution and (**) -- bit showing the 1-pixel data of one color -- bit showing the 1-pixel data of a number, resolution (Ha), and one color -- a number It has an amount-of-information conversion means to change into the mode which defined beforehand whether it was ********. It is characterized by transmitting the image data changed by said amount-of-information conversion means as image data which transmits to said color airline printer, and transmitting the print mode information which expresses said print mode further to said color airline printer.
[0017] Invention according to claim 8 is the color printing control approach. Moreover, a host computer to print data, The print mode information which expresses one print mode in two or more print modes, and specifies the print mode of said print data is received. The printing image

generation step which generates printing image data for said print data according to said print mode information, The step which stores said generated printing image data in the printing image storing section, The 1st output step which outputs the signal for a drive which carries out the ON/OFF drive of the laser diode for inputting the printing image data from said printing image storing section, and exposing image support by exposure light, and by which Pulse Density Modulation was carried out, The 2nd output step which outputs the signal for a laser drive which inputs the printing image data from said printing image storing section, and carries out the ON/OFF drive of said laser diode, and by which Pulse Density Modulation is not carried out, It is characterized by having the output selection step which carries out the selection output of one signal of the signals for a laser drive outputted by said 1st and 2nd output step based on said print mode information.

[0018] Invention according to claim 9 is the color printing control approach according to claim 8. Moreover, said print mode The amount of information per pixel of one color contains a multiple-value print mode 2 bits or more and the binary print mode whose amount of information per pixel of one color is 1 bit. Said printing image generation step Said print mode information at the time of a multiple-value print mode The code data contained in said print data are changed into multiple-value data 2 bits or more. Said print mode information at the time of a binary print mode It is the step which changes into 1-bit binary data the code data contained in said print data. Said output selection step The signal for a laser drive outputted by said 1st output step when said print mode information was a multiple-value print mode is outputted. When said print mode information is binary print mode information, it is characterized by being the step which outputs the signal for a laser drive outputted by said 2nd output step.

[0019] Moreover, invention according to claim 10 is the color printing control approach according to claim 9. The binary printing image data the binary amount of information per pixel of one color from said printing image storing section is 1 bit is inputted. It has further the conversion step changed and outputted to the printing image data of a multiple value according to the translation table defined beforehand. Said binary aforementioned print mode When said print mode information is furthermore a ** toner print mode including a ** toner print mode, Said 1st output step inputs and processes the printing image data outputted by said conversion step. Said output selection step When said print mode information is a ** toner print mode, it is characterized by outputting the signal for a laser drive outputted by said 1st output step.

[0020] Invention according to claim 11 is the color printing control approach according to claim 9. Moreover, said 2nd output step The clock frequency of a frequency higher than the clock frequency of the pixel unit which carries out the ON/OFF drive of said laser diode in said 1st image output section is used. The signal for a laser drive which carries out the ON/OFF drive of said laser diode is generated. Said printing image generation step It is based on said print mode information. Said 1st output step, Or it is characterized by generating the printing image data corresponding to the 2nd [ said ] output step which has the clock frequency of a frequency higher than the clock frequency of the pixel unit which carries out the ON/OFF drive of said laser diode in said 1st output step.

[0021] Moreover, invention according to claim 12 is the color printing control approach according to claim 8 to 11, and said 1st and 2nd output steps are characterized by having the step which carries out smoothing of each output signal.

[0022] Moreover, invention according to claim 13 is the color printing control approach according to claim 8 or 9, and when said print data consist of data of two or more colors and said print mode information shows a binary print mode, it is characterized by performing printing processing at a high speed compared with the case where said print mode information shows a multiple-value print mode.

[0023] Invention according to claim 14 moreover, the signal for a laser drive which carries out the ON/OFF drive of the laser diode for exposing image support by exposure light The 1st image output section equipped with the Pulse-Density-Modulation circuit outputted per pixel using the 1st clock frequency, The 2nd image output section which outputs the signal for a laser drive which carries out the ON/OFF drive of said laser diode, and by which Pulse Density Modulation is not carried out using a different frequency from said 1st clock frequency, Input the signal for a laser drive from said 1st and 2nd image output section, and it is based on the inputted print mode information, and the selection output of one [ a gap or ] signal is carried out. It is the color print-data art equipped with the selection mechanical component which drives said laser diode by the signal which carried out the selection output for color airline printers. According to said print mode specified by the user, about the image data contained in the data which were received from application, and which should be printed (**) -- resolution and (**) -- bit showing the 1-pixel data of one color -- bit showing the 1-pixel data of a number, resolution (Ha), and one color -- a number It has the amount-of-information conversion step changed into the mode which defined beforehand whether it was ********. It is characterized by having the step which transmits the image data changed by said amount-of-information conversion means as image data which transmits to said color airline printer, and transmits the print mode information which expresses said print mode further to said color airline printer.

[0024]

[Embodiment of the Invention] Hereafter, this invention is explained with reference to a drawing.

[0025] First, it explains, referring to drawing 3 and drawing 4 about the conventional configuration of a suitable multiple-value color laser beam printer to apply this invention. In addition, the printer which can apply this invention is not restricted to a color laser beam printer, and it cannot be overemphasized that the color multiple-value printer of other print methods, such as a monochrome multiple-value printer and a idye sublimation printer, may be used.

[0026] Drawing 3 is the sectional view showing the configuration of the printer which can apply this invention, and shows the case of a color laser beam printer (CLP).

[0027] Code data and the image data which were described in the printer language which a sign 1600 is a CLP body and is sent from an external host computer in drawing are received. The image generation section control section 1000 (it may only be hereafter described as a "controller") which generates the Magenta for 1 page, cyanogen, yellow, and the multiple-value image data of black based on these data (= controller), A latent image is formed by scanning the laser beam modulated according to input multiple-value image data on a photoconductor drum. It consists of the printing sections (= printer engine) 1500 (following engine) which perform record by a series of electrophotography processes of making it established after imprinting this on the recording paper. A sign 1530 is a control panel with which a switch, a LCD drop, etc. for actuation are allotted. In addition, the functional partition of a controller and an engine in this drawing is a partition in the conventional example, and it has included even the part which finally generates the driving signal of laser diode in the range called a controller so that it may mention later in this invention. However, the difference in this partition approach has produced the signal for a drive of laser diode from the need of carrying out change-over control, in this invention so that it may mention later.

[0028] The controller 1000 and engine 1500 in drawing 3 are connected by the interface signal line 1200. As main interface signals, there are /RDY, /PRNT, /TOP, /LSYNC, VDO7-VDO0, and VCLK, and this is explained briefly hereafter.

[0029] A /RDY signal will be a signal sent out from an engine to a controller, and if the /PRNT signal which an engine mentions later is received, it will be a signal which shows that it is in the condition which can start print actuation at any time, or the condition that print actuation is continuable. A /PRNT signal is a signal sent out from a controller to an engine, and is a signal which directs continuation of initiation of print actuation, or print actuation. A /TOP signal is a synchronizing signal of the direction of vertical scanning (vertical scanning), and is sent out from an engine to a controller.

[0030] A /LSYNC signal is a synchronizing signal of the direction of horizontal scanning (horizontal scanning), and is sent out from an engine to a controller. VDO7 - VDO0 signal is a picture signal sent out from a controller to an engine, and shows the image concentration information which an engine should print. VDO7 is expressed with the 8 bits top and lowest in VDO0. With an engine, if VDO7 - VDO0 signal is FFh (h expresses a hexadecimal display), it will print by the maximum concentration of the toner color in development, and if it is 00h, it will not print. These are sent out synchronizing with the transfer synchronizing signal VCLK.

[0031] Next, the actuation in an engine 1500 is explained using drawing 3 and drawing 4 . An engine 1500 will rotate a photoconductor drum 1506 and the imprint drum 1508 in the direction of an illustration arrow head by the non-illustrated mechanical component, if a /PRNT signal is received from a printer controller 1000. Then, electrification of the roller electrification machine 1509 is started and the potential on a photoconductor drum 1506 is charged in a predetermined value at homogeneity. Next, the record form 1528 is fed to the imprint drum 1508 from the record form cassette 1510 with the feed roller 1511. The imprint drum 1508 is what stretched the dielectric sheet on the base material in the air, and rotates in the direction of an arrow head by the photoconductor drum 1506 and this **. When the record form 1528 is supplied to this imprint drum 1508, the record form 1528 is held by the gripper 1512 prepared on the base material of an imprint drum, and the record form 1528 is made to stick to the imprint drum 1508 with the adsorption roller 1513 and the electrification vessel 1514 for adsorption. Coincidence is made to rotate the base material 1515 of a developer, and developer 1516M containing the toner of the Magenta which is the 1st toner among four developers 1516M, 1516C, and 1516Y supported by the base material 1515 and 1516Bk are made to counter a photoconductor drum 1506. In addition, the developer into which, as for 1516C, the toner of cyanogen went, the developer into which, as for 1516Y, the toner of yellow went, and 1516Bk are the developers containing the toner of black.

[0032] On the other hand, printer engine 1500 detects the tip of the record form 1528 by which the imprint drum 1508 was adsorbed with a detector 1517, generates a Vertical Synchronizing signal/TOP to predetermined timing, and sends it out to a controller 1000. A controller 1000 will read the data of the Magenta which is the 1st printing color among the image data stored in the page memory in a printer RAM 1002 to predetermined timing, if the first /TOP signal over a printing page is received. The read 8-bit image data D7-D0 is sent out to printer engine as picture signals VDO7-VDO0 synchronizing with a VCLK signal.

[0033] VDO [ which was outputted from the controller ]7 - VDO0 signal is inputted into the pulse-width-modulation circuit 1501 as shown in drawing 4 , it turns into the laser driving signal VDO of the pulse length (256 steps) according to the level expressed by VDO7-VDO0, and is sent out to the laser driver 1502. According to the pulse width of the laser driving signal VDO, the coating weight of a toner can be adjusted at the time of the development mentioned later, and, thereby, the shade of each color 256 gradation can be reproduced. Next, the laser beam 1527 from the laser diode 1503 driven according to said laser driving signal VDO in drawing 4 is deflected by the rotating polygon 1504 by which a rotation drive is carried out in the direction of an arrow head by the non-illustrated motor, scans a photoconductor drum 1506 top to a main scanning direction through the image formation lens 1505 arranged on an optical path, and forms a latent image on a photoconductor drum 1506. At this time, the beam detector 1507 detects the scan start point of a laser beam, and the /LSYNC signal which is a Horizontal Synchronizing signal for determining the image beginning timing of horizontal scanning from this detecting signal is generated.

[0034] Actuation of horizontal scanning described above is repeated in the direction of vertical scanning, and the latent image of the Magenta for 1 page is formed on the photoconductor drum 1506.

[0035] The latent image formed on return and a photoconductor drum 1506 at drawing 3 is developed by developer 1516M containing the toner of the above-mentioned Magenta, and turns into a toner image of a Magenta. The toner image of this Magenta is imprinted by the record form 1528 with which the rotating imprint drum 1508 is adsorbed by the electrification machine 1519 for an imprint. Under the present circumstances, the toner which remained on the photoconductor drum 1506, without imprinting is removed by cleaning equipment 1525. Of the above actuation, the toner image of the Magenta for 1 page is formed on the record form 1528.

[0036] Next, the base material 1515 of a developer is rotated and developer 1516C containing the toner of the cyanogen which is the 2nd toner is made to counter a photoconductor drum 1506. Then, a detector 1517 detects the tip of the record form 1528 which rotates like the time of a Magenta while the imprint drum 1508 had been adsorbed, a Vertical Synchronizing signal/TOP is generated, and it sends out to a controller 1000. In response, a controller 1000 reads the data of cyanogen from the page memory in RAM1002. Hereafter, on the record form 1528, the toner image of cyanogen is imprinted in piles by the toner image of a Magenta by same actuation.

[0037] Furthermore, the toner image of the black which is the yellow and the 4th toner which are the 3rd toner similarly will be imprinted in piles on the record form 1528, and, finally the toner image of a full color will be formed on a record form.

[0038] Through the separation electrification machine 1520, the record form 1528 with which all the toner images of the four above-mentioned color were imprinted is removed from the imprint drum 1508 by the separation pawl 1521, and is supplied to an anchorage device 1523 by the conveyance section 1522. Moreover, cleaning of imprint drum 1508 front face is performed by the imprint drum cleaner 1526 at this time.

[0039] By being heated and pressurized with an anchorage device 1523, melting fixing is carried out and the toner image on the record form 1528 turns into a final color output image. And the record form 1528 which record ended is delivered to a paper output tray 1524.

[0040] In drawing 5 , a sign 3000 is a host computer and a sign 2000 is the control unit of a host computer. It has CPU2001 which performs the document processing system in which the graphic form, the image, the alphabetic character, the table (a spreadsheet etc. is included), etc. were intermingled based on the document processing system program memorized by ROM for a program of ROM2003, and CPU2001 controls each device connected to a system bus 2004 in the gross by the control unit 2000 of a host computer.

[0041] Moreover, the control program of CPU2001 etc. is memorized to ROM for a program of this ROM2003, the font data used for ROM for fonts of ROM2003 in the case of the above-mentioned document processing system are memorized, and ROM for data of ROM2003 memorizes the various data (for example, overlay form data, background image data, an external character, etc.) used in case the above-mentioned document processing system etc. is performed. A sign 2002 is RAM and functions as the main memory of CPU2001, a work area, etc. A sign 2005 is a keyboard controller (KBC) and controls the key input from a keyboard 3001 or a non-illustrated pointing device. A sign 2006 is a CRT controller (CRTC) and controls the display of CRT display (CRT) 3002. A sign 2007 is a disc controller (DKC) and controls access with external memory 3003, such as a hard disk (HD) which memorizes a boot program, various applications, font data, a user file, an edit file, a print-data generation processing program (the following, printer driver), etc., and a floppy (trademark) disk. A sign 2008 is a network controller (NWC), and it prints by connecting with a printer 1500 through a network 4001, it connects with non-illustrated other host computers, and it manages transmission and reception of data.

[0042] In addition, CPU2001 performs expansion (rasterize) processing of the outline font to the display information RAM set up for example, on RAM2002, and makes WYSIWYG on CRT3002 possible. Moreover, CPU2001 opens the various windows registered based on the command directed by the mouse cursor which is not illustrated on CRT3002, and performs a setup of the printing art for a printer driver including various data processing and selection of a print mode etc.

[0043] In an engine 1500, it is Printer CPU, a sign 1001 controls access with various kinds of devices connected to a system bus 1004 based on the control program memorized by ROM for a program of ROM1003 in the gross, and it outputs the picture signal as a print-out to the optical unit in an engine at the same time it carries out generalization control of the printing section (engine) 1500 connected through the printing section interface 1006. Moreover, the control program of CPU1001 etc. is memorized for the program ROM of this ROM1003. The font data used in case the above-mentioned print-out is generated to ROM for fonts of ROM1003 were memorized, and overlay form, external-character information, etc. which are used on a host computer are memorized to ROM for data of ROM1003.

[0044] The communications processing with a host computer of CPU1001 has become possible through the network controller (NWC) 1005, and the host computer 3000 constitutes the information in a printer etc. possible [ a notice ]. A sign 1002 is RAM which functions as the main memory of CPU1001, a work area, page memory, etc., and it is constituted so that memory space can be extended with the RAM module for an escape connected to the extension port which is not illustrated. In addition, RAM1002 is used for a print-out expansion field, an environmental data storage field, etc. A sign 1007 is hardware which assists that CPU1001 generates print data by the operation with the image generation section. It has the function which carries out high-speed processing of enlarging or contracting of print data, rotation, color conversion, the superposition, etc. by the logical circuit. Moreover, a switch, a LCD drop, etc. for actuation are allotted by the control unit which the sign 1530 mentioned above. Furthermore, it has NVRAM which is not illustrated and you may make it memorize the printer mode setting information from a control panel 1530.

[0045] In the printing system which consisted of these units, this invention adds two or more picture

signal output sections and the change-over section which chooses the image information from each picture signal output section according to a print mode to the image generation section control section in a printer, and is realizing the duplex-printing gestalt of 600dpi / 4-bit multiple-value highly minute printing printing, and 1200*600dpi / 1-bit binary high-speed printing.
[0046] The operation gestalt of this invention is explained below at a detail.
[0047] (First operation gestalt) The block diagram of the printing system which is the first operation gestalt of this invention is shown in drawing 1 . Since the same number is added to the block already explained in the conventional example all over drawing, explanation of the part is omitted.
[0048] A sign 1 is the color laser beam printer which applied this invention, and consists of a printer controller 2 and printer engine 3.
[0049] Based on the printing image information 101 from a host computer 3000, the printing image generation section 1007 which finally generates the image information (bit map data) 103 and 104 of a pixel unit is in a printer controller 2. The printing image storing section 1002 is constituted in the above-mentioned printer RAM 1002. Use bit map data in case the amount of information per pixel of each color is 2 bits or more as the multiple-value bit map data 103, and let bit map data in case the amount of information per pixel of each color is 1 bit be the binary bit map data 104.
[0050] A sign 4 is the multiple-value picture signal output section, connotes the above-mentioned pulse width modulator 1501 which determines the pulse width of a laser diode driving signal from the multiple-value smoothing section 5 which amends the profile of a printing image smoothly, the multiple-value VCLK generation section 6 which generates the video clock which determines the resolution at the time of multiple-value printing, and 8bitVDO signals, and has the function which generates the multiple-value VDO signal 106 which carries out fixed [ of the laser driving pulse width of face ] from the multiple-value bit map data 103. In the example of this invention, the frequency of the multiple-value VDO signal 106 is a frequency for 600dpi printing.
[0051] A sign 7 is the binary picture signal output section, connotes the binary smoothing section 8 which amends the profile of a printing image smoothly, and the binary VCLK generation section 9 which generates the video clock which determines the resolution at the time of binary printing, and has the function which generates the binary VDO signal 107 which specifies ON-OFF of laser from the binary bit map data 104. The frequency of the binary VDO signal 107 is made into the frequency higher than the frequency for 600dpi printing of the multiple-value VDO signal 106 for 1200dpi printing in the example of this invention.
[0052] A sign 10 is the video signal change-over section, according to the inputted print mode information 102, chooses the multiple-value VDO signal 106 or the binary VDO signal 107, and has the function which outputs the laser driving signal 108 which drives laser diode through the laser driver 1502.
[0053] In addition, although the component which was the Lord in a controller 2 was not illustrated, it is the same as that of the above-mentioned controller 1000, and although the component which was the Lord in printer engine 3 was not illustrated, it is the same as that of the above-mentioned engine 1500. However, even the laser driver was included in the controller and henceforth is included in printer engine from the laser diode. This is for performing switch control of the video signal switch section within a controller.
[0054] Hereafter, drawing 1 and drawing 2 explain that the processing in this invention flows. In addition, in multiple-value color printing, in 600*600dpi / 8 bits, and binary color printing, the resolution and the gradation value of a color laser beam printer of this invention are set to 1200*600dpi / 1 bit.
[0055] The printer driver program which operates on a host computer 3000 changes into the printing image information 101 the data created by application software in response to the printing demand from application software, such as a word processor and Draw, and transmits them to the color laser beam printer 1. In case a user performs a printing demand at this time, the print mode about resolution and a gradation value can be specified by the user interface of a printer driver program. A printer driver program processes the image data contained in the data created with application software based on the resolution and the gradation value according to the print mode specified by the user, and it will generate the printing image information 101 including code data (if it is). That is, the image data in the data created by application software when the multiple-value color print mode was

specified is changed into multiple-value color data by 600*600dpi / 8 bits (S101M), if a binary color print mode is specified, it will change into binary color data by 1200*600dpi / 1 bit (S101B), and the printing image information 101 is generated. And a printer driver program transmits the printing image information 101 to the color laser beam printer 1 with the print mode information 102 used for this conversion (S102).

[0056] In the printing image generation section 1007, the printing image information 101 and the print mode information 102 which were transmitted by the host 3000 are received, and it considers as pixel unit image information (bit map data) based on the print mode information 102 about the code data in the printing image information 101 (for example, PDL data), outputs including the image data already processed by the print driver of a host computer, and develops to the printing image storing section 1002 (S103M, 103B).

[0057] When the print mode information 102 has chosen multiple-value color printing, the multiple-value bit map data of a color are stored in the printing image storing section 1002. 8bit data VDO [7:0] 105 as pixel unit information which performed smoothing processing to it by the multiple-value smoothing section 5 from it synchronizing with the video clock for 600dpi from the multiple-value VCLK generation section 6 (transfer synchronizing signal) when the multiple-value bit map data 103 were inputted into the multiple-value picture signal output section 4 from the printing image storing section 1002 are generated (S104M). These 8-bit data VDO [7:0] 105 is changed into the multiple-value VDO signal 106 which has the pulse length corresponding to 8-bit data in a pixel unit by the pulse-width-modulation circuit 1501 (S105M), and this signal is inputted into the video signal change-over section 10. In the video signal change-over section 10, using the print mode information 102, the input port of the multiple-value VDO signal 106 is effective, and the laser driving signal 108 is generated through the laser driver 1502 by using the multiple-value VDO signal 106 as the source (S106). A laser diode 1503 adjusts the diameter of a spot of a laser beam 1527 with the laser driving signal 108, and forms a multiple-value electrostatic latent image on a photoconductor drum 1506 (S107). By performing printing processing for such processing to YMCK4 color using each toner, multiple-value color printing each color of whose is 600*600dpi / 8 bits can be performed.

[0058] On the other hand, when the print mode information 102 has chosen binary color printing, the binary bit map data of a color are stored in the printing image storing section 1002. If the binary bit map data 104 are inputted into the binary picture signal output section 7 from the printing image storing section 1002, synchronizing with the video clock for 1200dpi from the binary VCLK generation section 6 (transfer synchronizing signal), the 1-bit data binary VDO signal 107 as pixel unit information that smoothing processing was performed by the binary smoothing section 8 will be generated (S104B), and it will input into the video signal change-over section 10. In the video signal change-over section 10, using the print mode information 102, the input port of the binary VDO signal 107 is effective, and the laser driving signal 108 is generated through the laser driver 1502 by using the binary VDO signal 107 as the source (S106). A laser diode 1503 a laser beam 1527 with the laser driving signal 108, and forms a binary electrostatic latent image on a photoconductor drum 1506 (S107). By performing printing processing for such processing to YMCK4 color using each toner, the binary color printing result each color of whose is 1200*600dpi / 1 bit can be performed (S108B).

[0059] Here, in 600*600dpi / 8-bit multiple-value color printing, the memory space of an area of 1 inch around is 600*600*8=2.75Mbit per color, and, in 1200*600dpi / 1-bit binary color printing, it is 0.69Mbit per color. Therefore, when it is the configuration in which multiple-value color printing is possible, it is possible to fully store the data of binary color printing as a capacity of the image information storing section.

[0060] As opposed to the color printer system equipped with the image information generation section which enables high definition color multiple-value printing as mentioned above, the image information storing section, and the multiple-value image output section which outputs a signal to the laser driver of printer engine. The bit map data which extend the function of the image information generation section and change with print modes, respectively are generated. Furthermore, it corresponds to the classification of a print mode. According to an individual The smoothing section, a video clock, By preparing the image output section with the VDO data-conversion section, choosing the output of two or more image output sections, and outputting a signal to the laser driver of printer engine As natural, high definition color multiple-value printing can build the color airline printer to realize, without increasing the memory space of the image information storing section for high definition high-speed color binary printing.

[0061] In addition, in the explanation mentioned above, although explained taking the case of the color airline printer, applying to the airline printer of monochrome is also possible. Moreover, in a color airline printer, it is clear for it to be able to apply, also in case binary monochrome printing is carried out.

[0062] (Second operation gestalt) Drawing 6 is drawing showing the block diagram of the printing system of the second operation gestalt of this invention. Since the same number is added to the block already explained in the conventional example among drawing, explanation is omitted about the part.

[0063] A sign 1 is the color laser beam printer which applied this invention, and consists of a printer controller 21 and printer engine 3.

[0064] Based on the printing image information 201 from a host computer 3000, the printing image generation section 1007 which, finally (code data, such as PDL), generates the image information (bit map data) 203 and 204 of a pixel unit is in a printer controller 21. Use bit map data in case the amount of information per pixel of each color is 2 bits or more as the multiple-value bit map data 203, and let bit map data in case the amount of information per pixel of each color is 1 bit be the binary bit map data 204.

[0065] A sign 22 is the ** toner picture signal output section which outputs the image for ** toners, and when a binary color ** toner print mode is chosen, from the printing image storing section, binary bit map data are sent and it is started. It has in the interior the data width-of-face transducer 23 which consists of a translation table, and 1-bit data are changed into the multiple-value (8 bits) data according to extent of a ** toner here. This conversion is changed with 1->80h and 0->00h, when realizing 50% ministry toner printing, and when realizing 25% ministry toner printing, it is changed with 1->40h and 0->00h. These translation tables are chosen by the level in ** toner mode. The data changed in the ** toner picture signal output section are inputted into the Pulse-Density-Modulation circuit 1501.

[0066] A sign 24 is the multiple-value picture signal output section. The multiple-value smoothing section 5 which amends the profile of a printing image smoothly, the multiple-value VCLK generation section 6 which generates the video clock which determines the resolution at the time of multiple-value printing, and the above-mentioned Pulse-Density-Modulation circuit 1501 which determines the pulse width of a laser diode driving signal from 8bitVDO signals are connoted. It has the function which generates the multiple-value VDO signal 206 which carries out fixed [ of the laser driving pulse width of face ] from the multiple-value bit map data 203 and the 8-bit data 207 from the ** toner image output section 22. In the example of this invention, the frequency of the multiple-value VDO signal 206 is a frequency for 600dpi printing.

[0067] A sign 7 is the binary picture signal output section, connotes the binary smoothing section 8 which amends the profile of a printing image smoothly, and the binary VCLK generation section 9 which generates the video clock which determines the resolution at the time of binary printing, and has the function which generates the binary VDO signal 208 which carries out fixed [ of ON-OFF of laser ] from the binary bit map data 204. In the example of this invention, the frequency of the binary VDO signal 208 is a frequency higher than the frequency of the multiple-value VDO signal 206 for 1200dpi printing.

[0068] A sign 10 is the video signal change-over section, according to the inputted print mode information 202, chooses the multiple-value VDO signal 206 or the binary VDO signal 208, and has the function which outputs the laser driving signal 209 which drives laser diode through the laser driver 1502.

[0069] In addition, although the component which was the Lord in a controller 21 was not illustrated, it is the same as that of the above-mentioned controller 1000.

[0070] Drawing 6 and drawing 7 explain below that the processing in this invention flows. In addition, in multiple-value color printing, in 600*600dpi / 8 bits, and binary color printing, the resolution and the gradation value of a color laser beam printer of this invention are set to 1200*600dpi / 1 bit.

[0071] The printer driver program which operates on a host computer 3000 changes into the printing image information 201 the data created by application software in response to the printing demand from application software, such as a word processor and Draw, and transmits them to the color laser beam printer 1. In case a user performs a printing demand at this time, the print mode about resolution and a gradation value can be specified by the user interface of a printer driver program. A printer driver program generates the printing image information 201 with the resolution and the gradation value according to this assignment print mode. When a multiple-value color print mode is specified, namely, the image data in the data created by application software It changes into multiple-value color data by 600*600dpi / 8 bits (S201M). If a binary color print mode is specified, it will change into binary color data by 1200*600dpi / 1 bit (S201B). If binary color ** toner printing is specified, it will change into binary color data by 600*600dpi / 1 bit (S201S), and the printing image information 201 is generated. Subsequently, a printer driver program transmits the printing image information 201 to the color laser beam printer 1 with the print mode information 202 used for this conversion (S202).

[0072] The printing image information 201 and the print mode information 202 which were transmitted by the host 3000 in the printing image generation section 1007 are received. About the code data in the printing image information 201 (for example, PDL data), it considers as pixel unit image information (bit map data) based on the print mode information 202. It outputs including the image data already processed by the print driver of a host computer, and develops to the printing image storing section 1002 (S203M, S203S, S203B).

[0073] If the multiple-value bit map data 203 are inputted into the multiple-value picture signal output section 24 from the printing image storing section 1002 when the print mode information 202 has chosen multiple-value color printing, synchronizing with the video clock for 600dpi from the multiple-value VCLK generation section 6, 8bit data VDO[7:0] 205 which are the pixel unit information that smoothing processing was performed by the multiple-value smoothing section 5 will be generated (S204M). These 8-bit data VDO [7:0] 205 is changed into the multiple-value VDO signal 206 from which pulse width differs per pixel by the Pulse-Density-Modulation circuit 1501, and is inputted into the video signal change-over section 10 (S205M). In the video signal change-over section 10, using the print mode information 202, the input port of the multiple-value VDO signal 206 is effective, and the laser driving signal 209 is generated through the laser driver 1502 by using the multiple-value VDO signal 206 as the source (S206). A laser diode 1503 adjusts the diameter of a spot of a laser beam 1527 with the laser driving signal 209, and forms a multiple-value electrostatic latent image on a photoconductor drum 1506 (S207). 600*600dpi / 8-bit multiple-value color printing is obtained by performing printing processing for such processing to the toner of YMCK4 color (S208M).

[0074] Subsequently, if the binary bit map data 204 are inputted into the ** toner image output section 22 from the printing image storing section 1002 when the print mode information 202 chooses binary color ** toner printing It synchronizes with the video clock for 600dpi from the multiple-value VCLK generation section 6. By the data width-of-face transducer 23 1bit data"1" is changed into "80h", "0" is changed into "00h", and the ** toner 8bit data "80h/00h" 207 are generated (S204S). [ 8-bit ] These 8-bit data 207 are changed into the multiple-value VDO signal 206 from which pulse width differs per pixel by the Pulse-Density-Modulation circuit 1501, and are inputted into the video signal change-over section 10 (S205M). In the video signal change-over section 10, using the print mode information 202, the input port of the multiple-value VDO signal 206 is effective, and the laser driving signal 209 is generated through the laser driver 1502 by using the multiple-value VDO signal 206 as the source (S207). A laser diode 1503 adjusts the diameter of a spot of a laser beam 1527 with the laser driving signal 209, and forms a binary electrostatic latent image on a photoconductor drum 1506 (S207). 600*600dpi / 1-bit binary color ** toner printing is obtained by performing printing processing to the toner of YMCK4 color (S208S).

[0075] If the binary bit map data 204 are finally inputted into the binary image output section 7 from the printing image storing section 1002 when the print mode information 202 chooses binary color printing, synchronizing with the video clock for 1200dpi from the binary VCLK generation section 6, the 1-bit data binary VDO signal 208 as pixel unit information that smoothing processing was performed by the binary smoothing section 8 will be generated, and it will input into the video signal change-over section 10 (S204B). In the video signal change-over section 10, using the print mode information 202, the input port of the binary VDO signal 208 is effective, and the laser driving signal 209 is generated through the laser driver 1502 by using the binary VDO signal 208 as the source (S206). A laser diode 1503 a laser beam 1527 with the laser driving signal 209, and forms a binary electrostatic latent image on a photoconductor drum 1506 (S207). 1200*600dpi / 1-bit binary color printing result is obtained by performing printing processing to the toner of YMCK4 color (S208B).

[0076] As mentioned above, different resolution according to a print mode and the one image information generation section which finally generates bit map data with the number of bits per pixel, By preparing the image output section which has two or more smoothing sections different, respectively, a video clock, and the VDO data-conversion section corresponding to the image information storing section and the print mode which store the generated bit map data It can consider as the color airline printer equipped with the function of high definition high-speed color binary printing and high definition color multiple-value printing. It can constitute from adding a translation table for the function of binary ** toner printing, and furthermore, inputting the output of a translation table into the block of a multiple-value printing processor, and only light color-ization of a printout can be realized, without spoiling resolution.

[0077] Moreover, since color binary printing which used each color as binary data reduces the amount of data sent by the host, it is clear its to reduce a data transfer time when there is much image data, to bring about reduction of the processing time also in the bit map expansion in the interior of an airline printer further, and to bring about improvement in a print speed. Furthermore, since it prints with a clock frequency higher than color multiple-value printing in the operation gestalt mentioned above in the case of the graphic which image data does not equip with gradation like a photograph, printing of high resolution can be performed more at a high speed. This description suits the printing purpose in general office.

[0078]

[Effect of the Invention] As explained above, according to this invention, a host computer to print data, The printing image generation section which generates printing image data for print data according to said print mode information in response to the print mode information which expresses one print mode in two or more print modes, and specifies the print mode of said print data, The printing image storing section which stores the printing image data which the printing image generation section generated, The 1st picture signal output section equipped with the Pulse-Density-Modulation circuit which inputs the printing image data from the printing image storing section, and outputs the signal for a laser drive which carries out the ON/OFF drive of the laser diode for exposing image support by exposure light, The 2nd picture signal output section which outputs the signal for a laser drive which inputs the printing image data from the printing image storing section, and carries out the ON/OFF drive of the laser diode, and by which Pulse Density Modulation is not carried out, Since it had the selection mechanical component which inputs the signal for a laser drive of the 1st and 2nd picture signal output section, is based on print mode information, carries out the selection output of one [ a gap or ] signal, and drives laser diode by the signal which carried out the selection output The multi-par pass color printer which incorporated many functions for which a user is asked, such as high-definition color printing, high-speed color printing, and high-definition ** toner printing, is realizable.

[0079] furthermore, according to the print mode specified by the user, about the image data contained in the data which were received from application, and which should be printed (**) -- resolution and (**) -- bit showing the data of the pixel of one color -- bit showing the data of the pixel of a number, resolution (Ha), and one color -- a number It has the amount-of-information transducer changed into the mode which defined beforehand whether it was ********. Since the image data changed by the amount-of-information transducer as image data which transmits to a color airline printer is transmitted and the print mode information which expresses a print mode further was transmitted to the color airline printer It has the effectiveness which increases the efficiency of data transfer, without sending unnecessary data to an airline printer, since the amount of transfers of the print data containing the image from a host computer is reduced according to a print mode.

[0080] Moreover, since are the phase of a printer driver, the resolution at the time of printing is made to agree and image data is generated from a material image about the image created with application at the time of color binary printing, when the so-called resolution of a material image is high, resolution reduction from a material image can be suppressed namely, considered as all possible high resolution image printings at min. When the resolution at the time of full color printing is especially raised for the resolution at the time of color binary printing, there is an advantage which makes high-speed time amount after carrying out printing activation actuation by the host side until it obtains a printout compared with the rate at the time of multiple-value printing including data processing by the side of a host.

[Translation done.]

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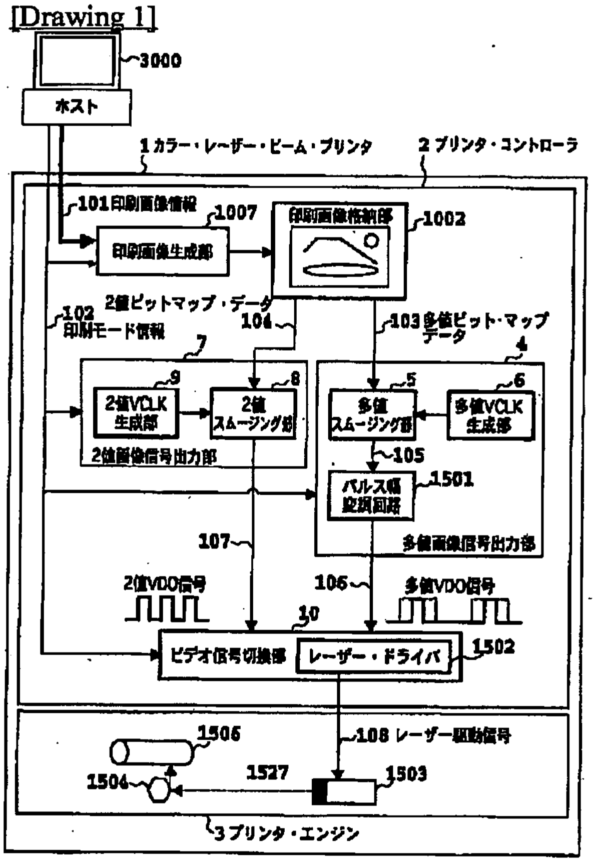
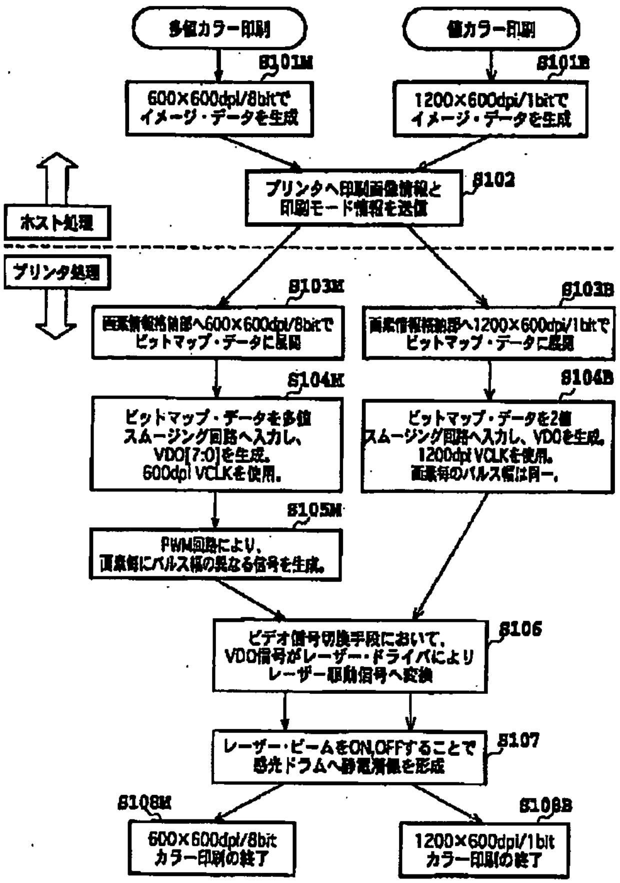
## DRAWINGS

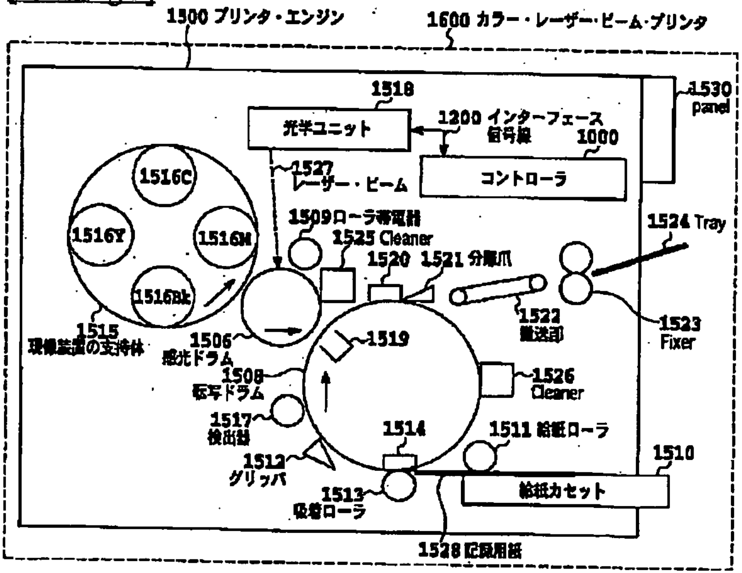
[Drawing 1]



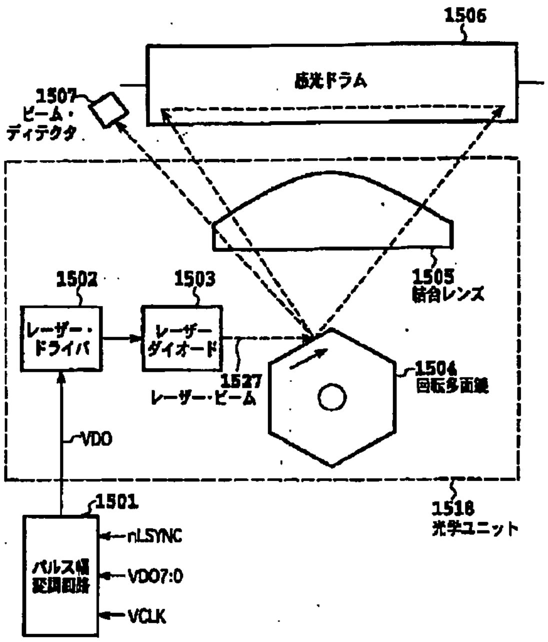
[Drawing 2]


多値カラー印刷
値カラー印刷
S101M
600×600dpi/8bitでイメージ・データを生成
S101B
1200×600dpi/1bitでイメージ・データを生成
S102
プリンタへ印刷画像情報と印刷モード情報を送信
ホスト処理
プリンタ処理
S103M
画素情報格納部へ600×600dpi/8bitでビットマップ・データに展開
S103B
画素情報格納部へ1200×600dpi/1bitでビットマップ・データに展開
S104M
ビットマップ・データを多値スムージング回路へ入力し、VDO[7:0]を生成。600dpi VCLKを使用。
S104B
ビットマップ・データを2値スムージング回路へ入力し、VDOを生成。1200dpi VCLKを使用。画素毎のパルス幅は同一。
S105M
PWM回路により、画素毎にパルス幅の異なる信号を生成。
S106
ビデオ信号切換手段において、VDO信号がレーザー・ドライバによりレーザー駆動信号へ変換
S107
レーザー・ビームをON,OFFすることで感光ドラムへ静電潜像を形成
S108M
600×600dpi/8bit カラー印刷の終了
S108B
1200×600dpi/1bit カラー印刷の終了

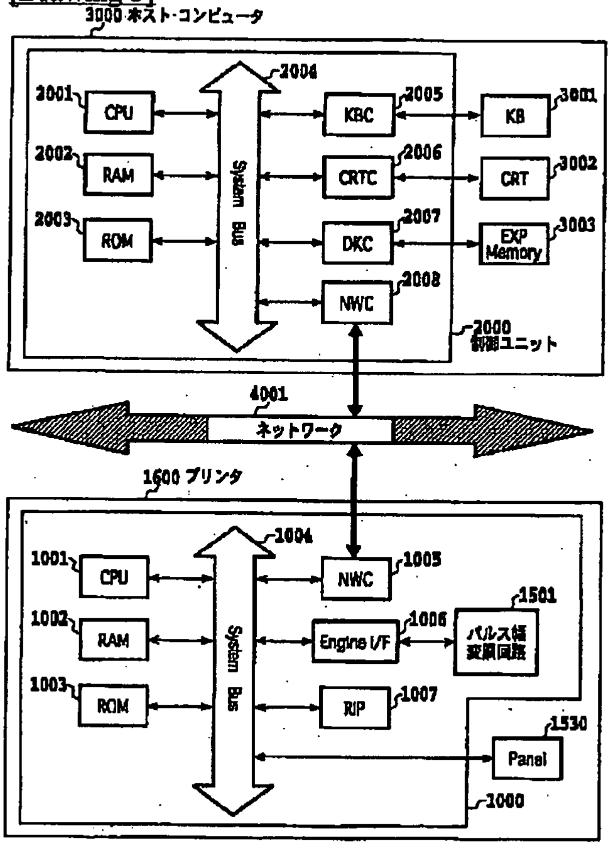
[Drawing 3]



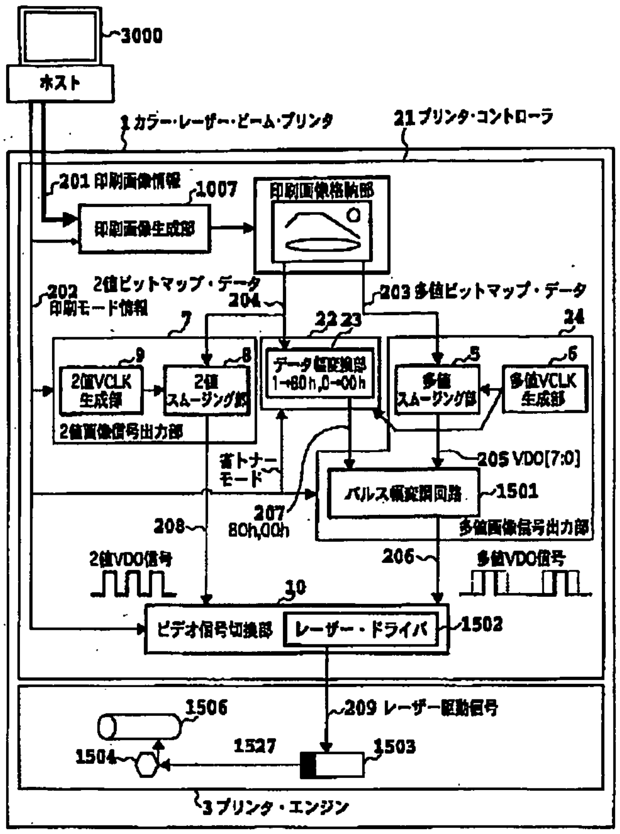
[Drawing 4]



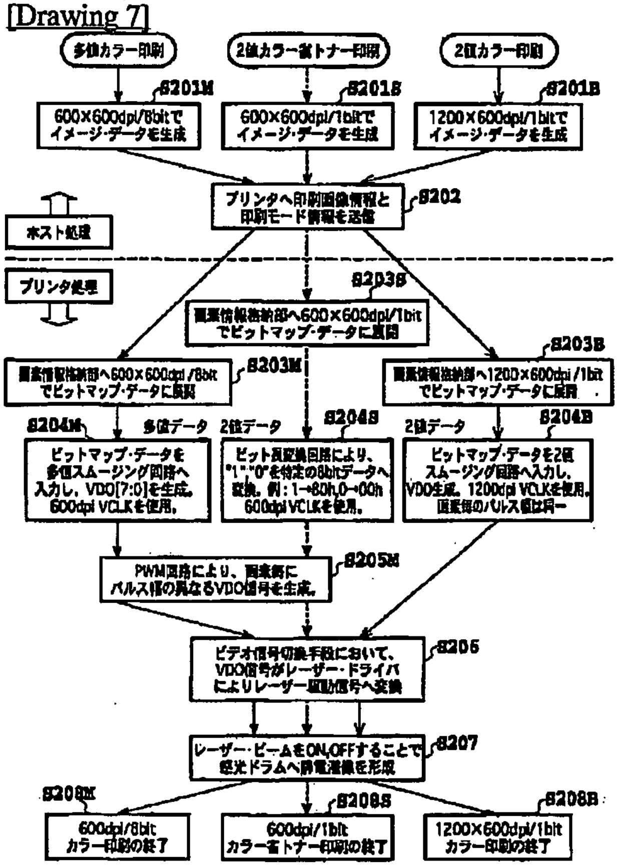
[Drawing 5]



[Drawing 6]


3000
ホスト
1 カラー・レーザー・ビーム・プリンタ
21 プリンタ・コントローラ
201 印刷画像情報
1007
印刷画像生成部
印刷画像格納部
2値ビットマップ・データ
204
202
印刷モード情報
203 多値ビットマップ・データ
7
22 23
24
9
2値VCLK生成部
8
2値スムージング部
データ幅変換部
1→80h,0→00h
5
多値スムージング部
6
多値VCLK生成部
2値画像信号出力部
省トナーモード
205 VDO[7:0]
パルス幅変調回路
1501
207
80h,00h
208
多値画像信号出力部
2値VDO信号
206
多値VDO信号
10
ビデオ信号切換部
レーザー・ドライバ
1502
209 レーザー駆動信号
1506
1504
1527
1503
3 プリンタ・エンジン

[Drawing 7]


多値カラー印刷
2値カラー省トナー印刷
2値カラー印刷
S201M
600×600dpi/8bitでイメージ・データを生成
S201S
600×600dpi/1bitでイメージ・データを生成
S201B
1200×600dpi/1bitでイメージ・データを生成
プリンタへ印刷画像情報と印刷モード情報を送信
S202
ホスト処理
プリンタ処理
S203S
画素情報格納部へ600×600dpi/1bitでビットマップ・データに展開
S203M
画素情報格納部へ600×600dpi/8bitでビットマップ・データに展開
S203B
画素情報格納部へ1200×600dpi/1bitでビットマップ・データに展開
S204M
多値データ
2値データ
S204S
2値データ
S204B
ビットマップ・データを多値スムージング回路へ入力し、VDO[7:0]を生成。600dpi VCLKを使用。
ビット長変換回路により、"1","0"を特定の8bitデータへ変換。例：1→80h,0→00h 600dpi VCLKを使用。
ビットマップ・データを2値スムージング回路へ入力し、VDO生成。1200dpi VCLKを使用。画素毎のパルス幅は同一
PWM回路により、画素毎にパルス幅の異なるVDO信号を生成。
S205M
ビデオ信号切換手段において、VDO信号がレーザー・ドライバによりレーザー駆動信号へ変換
S206
レーザー・ビームをON,OFFすることで感光ドラムへ静電潜像を形成
S207
S208M
600dpi/8bit カラー印刷の終了
S208S
600dpi/1bit カラー省トナー印刷の終了
S208B
1200×600dpi/1bit カラー印刷の終了

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[Translation done.]

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